

## Achievement Standard

**Subject Reference** Digital Technologies 1.47

**Title** Demonstrate understanding of basic concepts used in the design and construction of electronic environments

**Level** 1      **Credits** 3      **Assessment** Internal

**Subfield** Technology

**Domain** Digital Technologies

**Status** Registered      **Status date** 20 January 2011

**Planned review date** 31 December 2016      **Date version published** 12 December 2013

This achievement standard involves demonstrating understanding of basic concepts used in the design and construction of electronic environments.

### Achievement Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<ul style="list-style-type: none"> <li>Demonstrate understanding of basic concepts used in the design and construction of electronic environments.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate in-depth understanding of basic concepts used in the design and construction of electronic environments.</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrate comprehensive understanding of basic concepts used in the design and construction of electronic environments.</li> </ul>

### Explanatory Notes

- This achievement standard is derived from Level 6 of the Technology learning area in *The New Zealand Curriculum*, Learning Media, Ministry of Education, 2007; and is related to the material in the *Teaching and Learning Guide for Technology*, Ministry of Education at <http://seniorsecondary.tki.org.nz>.

Further information can be found at <http://www.technology.tki.org.nz/>.

Appropriate reference information is available in *Safety and Technology Education: A Guidance Manual for New Zealand Schools*, Ministry of Education at <http://technology.tki.org.nz/Curriculum-support/Safety-and-Technology-Education>, and the Health and Safety in Employment Act 1992.

- 2 *Demonstrate understanding of basic concepts used in the design and construction of electronic environments* involves:
- describing concepts of electronics in practical contexts
  - describing the operational function of electronic components in a practical context (eg in a transistor switch sub-system).

*Demonstrate in-depth understanding of basic concepts used in the design and construction of electronic environments* involves:

- explaining the behaviour of electronic circuits
- explaining the operational function of electronic components in a practical context.

*Demonstrate comprehensive understanding of basic concepts used in the design and construction of electronic environments* involves:

- explaining the behaviour of electronic systems (eg the effect of voltage levels on the operation of a transistor switch sub-system)
- discussing the operational function of electronic components in a practical context (eg the effect of swapping the fixed resistor and the LDR in a voltage divider circuit).

- 3 *Electronic environments* refer to functional combinations of hardware and embedded software.

- 4 *Basic concepts* will include understanding of the function of electronic components, as well as at least five of the following:

- a circuit as a complete path
- voltage as an energy level
- current as rate of flow of charge
- conduction (limited to the macroscopic behaviour of conductors, insulators and semiconductors)
- circuit sub-systems
- symbolic conventions and schematics
- hardware (eg components and combinations of components)
- embedded systems as software subject to hardware constraints.

Electronic components include:

- microcontroller (one example)
- cell
- switch (one or more of – SPST, SPDT, reed, relay)
- resistor (one or more of – fixed, variable, light-dependent (LDR), thermistor), light-emitting diode (LED)
- motor
- voltage divider and transistor switch sub-systems.

- 5 Conditions of Assessment related to this achievement standard can be found at <http://ncea.tki.org.nz/Resources-for-aligned-standards/Technology/Level-1-Technology>.

**Quality Assurance**

- 1 Providers and Industry Training Organisations must have been granted consent to assess by NZQA before they can register credits from assessment against achievement standards.
- 2 Organisations with consent to assess and Industry Training Organisations assessing against achievement standards must engage with the moderation system that applies to those achievement standards.

Consent and Moderation Requirements (CMR) reference

0233